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Vital Statistics of Geneva:—an abridged translation from the French of M. Edouard Mallet. By RICHARD VALPY, ESQ.

THE memoir by M. Edouard Mallet, entitled "Historical and Statistical Inquiries respecting the Population of Geneva, from 1549 to 1833," appeared in the seventeenth volume of the "Annales d'Hygiène Publique," and the following abstract has been prepared, as the facts and results detailed by M. Mallet are not merely of local interest.

The city of Geneva stands in 46° 12′ north latitude, and in 3° 49′ longitude east of Paris, at an elevation of 1230 feet above the level of the sea. The mean temperature is 50·13 Fahrenheit; the mean height of the barometer $28\frac{66}{100}$; the diurnal variation of barometer $\frac{1}{33}$ inches; the mean of the hygrometer 81° 85′; and the quantity of rain or snow $30\frac{43}{100}$ inches. Northerly winds prevail, on an average, for 175 days, southerly for 128, and calms for 62 days, during the year.

In 1837 Geneva contained 1250 houses, or 1 house for every 21·7 inhabitants.

The progress of the population from 1543 to 1834, is exhibited by the following figures:

	Increase per Cent.		Increase per Cent.		Increase per Cent.
1543....13,000	—	1721....20,781	60	1805....22,300	71
1589....13,000	—	1755....21,816	68	1812....24,158	86
1693....16,111	24	1781....24,810	91	1822....24,886	91
1698....16,934	30	1785....25,500	96	1828....26,121	1·01
1711....18,500	42	1789....26,140	1·01	1834....27,177	1·09

It will be observed that the population steadily increased until the year 1789, when it numbered 26,140 souls. This number was reduced to 22,300 between 1789 and 1805; and, until the year 1828, the population did not again equal the number it had reached in 1789. To the French Revolution and its consequences may be attributed this retrocession, which interrupted, for nearly 40 years, the progressive increase of the population.

The average annual population, during the period of M. Mallet's own observations, from 1814 to 1833, may be estimated at 25,600, and this number is the basis of his calculations.

At Geneva, deaths were registered as early as 1549, and marriages and baptisms in 1550; but M. Mallet has not brought forward any figures relating to marriages, baptisms, or births, for an earlier period than 1695.

In this abstract, the subjects of M. Mallet's inquiries have been arranged in the order of marriages, births, deaths, vitality, and influence of the seasons.

The following table shows the average annual number of marriages, and their relative proportions to the population and births for periods of 20 years, from 1695 to 1791, and for the 7 years from 1805 to 1812.*

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* On the union of Geneva with France, the celebration of marriage became merely a civil contract, according to the law of September 20, 1792. By a law in 1816, a marriage, the preparatory deed of which had been prepared by the civil

Periods.	Average Annual Number.	Proportion to Population.	Proportion to Legitimate Births.
1695 to 1710....	132	1 to 134	1 to 4·88
1711 „ 1730....	171	„ 117	„ 3·90
1731 „ 1750....	186	„ 115	„ 3·63
1751 „ 1770....	213	„ 114	„ 3·62
1771 „ 1791....	211		
1805 „ 1812....	144	„ 161	„ 3·34

In the earlier periods, the marriages increased in number, but decreased in fecundity. The population, notwithstanding, continued to increase, which proves that the numerical and social progress of a population depends less upon the number of children born, than upon the number reared, and who reach an age of usefulness to themselves and others.

The number of marriages in subsequent years, from 1814 to 1833, is next given, together with the number of divorces.

Years.	Marriages.	Divorces.		
		Specified Causes.	Mutual Consent.	Total.
1814........	121	0	2	2
1815........	151	3	1	4
1816........	212	6	0	6
1817........	166	5	3	8
1818........	175	2	4	6
1819........	149	4	1	5
1820........	160	4	2	6
1821........	177	5	0	5
1822........	145	3	0	3
1823........	182	1	1	2
	1,638	33	14	47
1824........	199	2	0	2
1825........	179	4	0	4
1826........	169	1	2	3
1827........	181	3	3	6
1828........	210	3	2	5
1829........	204	1	1	2
1830........	192	2	0	2
1831........	200	3	1	4
1832........	245	4	0	4
1833........	199	3	0	3
	1,978	26	9	35
Total....	3,616	59	23	82

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officer, was not valid without the religious ceremony of the nuptial blessing. The law of 1816 was abrogated in 1831, when marriage again became only a civil contract, definitively concluded and confirmed before the civil officer, who merely reminds the parties of the duty which religion imposes upon them of consecrating their marriage by the nuptial blessing.

In the last 10 years the increase of the marriages was 20·75 per cent., or about $\frac{1}{5}$, whilst the population had increased $\frac{1}{8}$, and the divorces, during the same years, decreased 26 per cent. The average for the 20 years gives 1 marriage to 141 inhabitants, and to 2·71 births; but for the last 10 years, 1 to 129 inhabitants, and to 2·96 births.

M. Mallet observes that the proper comparison is not between the number of marriages and the total population, but between the number of marriages and that of individuals of a marriageable age in a given population; and this proportion varies with the longevity of the population, because the population which is endowed with the greatest longevity, possesses a nubile number proportionably greater than the population with a shorter period of life, which loses many individuals under the age of puberty. As the Genevese population enjoys a considerable longevity, we may conjecture that the proportionate number of its marriages is, in reality, less than it would appear from a mere inspection of the figures we have given.

To show an average of the relative domestic condition of the individuals who married from 1814 to 1833, the marriages contracted in the eight years 1814 and 1815, 1826 to 1830, and 1832, have been selected, and from them the following results are obtained. In the eight years the marriages were:—

	Marriages.	Proportions.
Between Bachelors and Spinsters	1,201	81·53
,, Bachelors and Widows	45	3·87
,, Bachelors and Divorced	12	
,, Divorced and Spinsters	5	12·36
,, Widowers and Spinsters	177	
,, Divorced and Widows	1	2·24
,, Widowers and Widows	31	
,, Widowers and Divorced	1	
	1,473	100·00

According to this classification, the following are the numbers of the first and second marriages of each sex:—

	First Marriages.	Second Marriages.
Males	1,258 (0·854)	215 (0·146)
Females	1,383 (0·939)	90 (0·061)

and, by taking the proportion between the first marriages and the total marriages, it will be seen that

100 males married for the first time in 117·1 marriages,
and 100 females ,, ,, 106·5 ,,

Therefore first marriages were contracted by

Males, in proportion to females, as 100 to 109·9, and by
Females, ,, males 90·9 ,, 100

consequently, in proportion to the total number of marriages, first marriages were more frequent amongst the females by about 10 per cent. But, were we to calculate the average annual proportions between the first marriages of each sex and the population of each sex, the males would have an advantage over the females of 6½ per cent. as regards first marriages, thus:—

$$\frac{11{,}749 \text{ males}}{154 \text{ first marriages}} = 76, \text{ and } \frac{13{,}851 \text{ females}}{170 \text{ first marriages}} = 81{\cdot}5$$

or 1 first marriage in 76 males, and 1 first marriage in 81 females.

The second marriages, defined by M. Mallet as the "*palingamique*[*]" force, exhibit a still greater excess on the part of the males, by whom they were contracted more than twice as often as they were by the females. In proportion to the total marriages, the second marriages of the males occurred as 1 in 6·85, and of the females as 1 in 16·36. The real numbers were 215 and 90, which bear to each other the proportions of 1 to 0·418 and 1 to 2·388. The superior "*palingamique*" force possessed by the male will appear somewhat remarkable when it is remembered that more wives survive their husbands than husbands their wives, a consequence of men marrying at a later age, and being endowed with a lower degree of longevity. Were these two counteracting causes not in operation, the "*palingamique*" force of the male would be still more powerful. M. Mallet calculates the female's chance of surviving her husband to be $\frac{1}{10}$ at the time of marriage.

In order to ascertain the average age of each sex at the time of marriage, calculations have been made on the numbers and ages of the persons married during the five years from 1826 to 1830,[†] as peace and prosperity then prevailed, and the population would, therefore, be in its usual and normal state. For that period we have these figures:—

	Aggregate Ages.			Average Ages at Marriage.	
	Years.	Months.		Years.	Months.
833 males	24,184	8	....	29	0
902 females	24,270	8	....	26	10
Superior average age of the males			....	2	2

As, at the age of 29, men have a probable life of 32·46 years, and women of 35·65 years at the age of 27, consequently, at the time of marriage, the probable life of women is longer by 3·19 years than that of their husbands, and this difference is as 11 to 19 in favour of females being the survivers.

The registers examined by M. Mallet exhibited all possible extremes and differences of real ages at the time of marriage:—For example, first marriages occurred between men of 65 and women of 60; widowers of 80 and upwards, and widows of 70, had not been deterred from entering again the matrimonial state; while, on the other hand, bachelors and spinsters were married at the legal ages of 18 and 15 respectively; but, during the twenty years from 1814 to 1833, these ages had not been anticipated by any dispensation.

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[*] From πάλιν, again, and γάμος, marriage.

[†]

	Average Age of Males.			Average Age of Females.	
	Years.	Months.		Years.	Months.
1826	29	4	....	26	10
1827	29	4	....	26	9
1828	28	10	....	27	0
1829	29	5	....	26	10
1830	28	4	....	27	0

In the next table are given the ages of the males and females, at the first as well as subsequent marriages, during the years 1826-30.

Ages.	Males.		Females.	
	Actual Numbers.	Proportions.	Actual Numbers.	Proportions.
Under 20 Years	8	0·8	81	8·5
From 20 to 30 Years	554	58·0	591	61·8
„ 30 „ 40 „	257	26·9	215	22·5
„ 40 „ 50 „	77	8·0	54	5·6
„ 50 „ 60 „	43	4·5	14	1·5
„ 60 „ 70 „	13	1·4	1	0·1
„ 70 „ 80 „	4	0·4	0	·0
Total	956	100·0	956	100·0

The following table exhibits the comparative ages of the persons married, and as the relative ages of husbands and wives appear to exert a considerable influence on the fecundity of marriages, the comparison is important and deserves attention.

Sex.	Difference of Age.	No. of Marriages.	Proportion.
Males older than Females, 656.	By 20 Years	28	2·93
	„ 15 to 20 Years	37	3·87
	„ 10 „ 15 „	94	9·83
	„ 5 „ 10 „	177	18·52
	„ 1 „ 5 „	256	26·78
	„ 1 Month to 1 Year	64	6·69
Both of equal age		10	1·04
Females older than Males, 290.	By 1 Month to 1 Year	67	7·01
	„ 1 to 5 Years	130	13·60
	„ 5 „ 10 „	69	7·22
	„ above 10 Years	24	2·51
	Total	956	100·00

By this table it will be seen that in thirty marriages per cent. the wife was older than the husband, which is a result unexpected and little in conformity with the notions which are generally entertained. And as the average marriage-age of the husband is only superior to that of the wife by 2 years and 2 months, it may be concluded that, at Geneva, the average marriage-age of the women is late when compared with that of the men. But this circumstance may be partly explained by the predominance of females in the population, and partly by there being in the town a great number of female servants who do not marry until they have accumulated sufficient means to settle in life.

With regard to the difference of age between husbands and wives, it is well known that when too great a difference exists the marriages are not very productive; and we may presume that this cause would exert an influence where the husband is more than 10 years older than the wife (which was 16·73 per cent. in the last table), and especially when the wife is more than 5 years older than the husband (which was 9·73 per cent.): these two examples made 26·36 per cent., or $\frac{1}{4}$ of the marriages in five years. A large proportion of the marriages contracted at such ages would be barren, or at least very unproductive.

Before the age of 25 for men and 21 for women, marriages can only take place with the consent of the parents. From 1826 to 1830, 199 males (one of whom was a widower) were married under 25 years, which is 20·8 per cent.; and 135 females under 21 years, which is 14·1 per cent.

Children born before marriage were made legitimate in the instances of 60 marriages, during the seven years 1814 and 1815, and 1826 to 1830, which is 4·88 per cent. or nearly $\frac{1}{20}$.

The relative proportions between the marriages and births from 1814 to 1833 have been already shown, at page 300, to be 1 to 2·71, or nearly $2\frac{3}{4}$ children to each marriage. If 517 still-born legitimate children are added, the proportion will be

2·7193	born alive.
0·1429	still-born.
2·8622	conceptions to each marriage.

This mode of calculating the proportion by the total number of marriages and the total number of births may be questioned, as the registers do not distinguish the marriages which have proved barren; and the births in a town do not exactly correspond with the marriages in the same town. In Geneva, children are born of parents who were married elsewhere, and persons who are married there settle in other parts. Besides, the births which are registered in one year do not correspond with the marriages celebrated in the same year, therefore the births which took place in 1814, when the offspring of the marriages of the previous year, and the births consequent on the marriages in 1833, will not appear before the following year.

These objections could not be overlooked in considering the fecundity of a population for one or two years only, but in doing so for a period of 20 years their force disappears. As the fruitfulness of the marriages of 1814-15-16 has probably ceased before 1833, and if the children who spring from the marriages of 1833 are excluded, their number will be nearly balanced by that of the children included from the marriages of 1813.

In the last 10 years of the seventeenth century one marriage produced 5 children; the probable life was scarcely 20, and Geneva contained barely 17,000 inhabitants. Towards the end of the eighteenth century there were but 3 children to a marriage; the probable life exceeded 32 years, and the population was 26,000. At the present time $2\frac{3}{4}$ children are the offspring of a marriage, the probable life is 45 years, and the population exceeds 27,000.

Marriages dissolved by mutual consent during the 20 years from 1814 to 1833, have lasted on an average from the day of celebration to that of the divorce granted by the civil officer (including the year for the necessary proceedings), 12 years, 2 months.

The average duration of marriages dissolved for specified causes (including the time of proceedings in pleading and defending), has been 13 years. Extreme cases, 1 at the end of 2 years 9 months, another at the expiration of 31 years 8 months.

When Geneva was subject to the laws of France, and divorces were easily to be obtained, their number was great. From the end of the year 1790 to the end of the year 1802, there were 796 marriages and 102 divorces, or 1 in 7·8. But since the facilities of gaining divorces have been restricted, a great alteration has occurred, as from the year 1803 to the end of 1833 there were 5,246 marriages and 109 divorces, or 1 in 48, which is six times less frequent than they were during the sad influence of the law of the 25th September, 1792.

The following particulars respecting celibacy refer entirely to females. The 5,690 female deaths, from 1814 to 1833, are divided thus:—

Spinsters	2,584	45·41
Wives	1,489	26·17
Widows and Divorced	1,617	28·42
	5,690	100·00

1,491 died before the legal marriage-age, or 15 years ($\frac{1}{4}$)	26·20	
Of the remaining marriageable 4,199—3,106 marry ($\frac{11}{20}$)	54·59	
Which is, on the number of marriageable	....	73·97
And 1,093 remain spinsters ($\frac{1}{5}$)	19·21	
Which is, on the number of marriageable	....	26·03
	100·00	100·00

Spinsters.			Years.	Per Cent.
Of these 1,093	160	die between	15 and 20	14·64
„	155	„	20 „ 25	14·18
„	102	„	25 „ 30	9·33
„	120	„	30 „ 40	10·98
„	98	„	40 „ 50	8·97
„	458	„	above 50	41·90
				100·00

In the Pays de Vaud, during the eighteenth century, it appears that of 4,714 females who arrived at 15 years of age, 3,615 married (0·7669); 350 died between 15 and 30 (0·0743); and 749 died above 30 (0·1588).

The question as to whether the married female lives longer than the unmarried has not been considered. But Muret says that the former at 20 has an average life of 2 years beyond that of the latter; and D'Odier gives the married female at that age a superiority of 9 or 10 years. However this may be, it should not be forgotten that the class of young married women is, as Muret observes, composed of picked individuals.

We now come to the subject of Births, and the next table exhibits their number, in decennial periods, from 1695 to 1791.

Periods.	Males.	Females.	Total.
1695 to 1700........	1,909	1,839	3,748
1701 „ 1710........	3,391	3,209	6,600
1711 „ 1720........	3,374	3,177	6,551
1721 „ 1730........	3,538	3,268	6,806
1731 „ 1740........	3,513	3,348	6,861
1741 „ 1750........	3,405	3,275	6,680
1751 „ 1760........	3,847	3,727	7,574
1761 „ 1770........	3,957	4,098	8,055
1771 „ 1780........	4,020	3,873	7,893
1781 „ 1791........	4,068	3,928	7,996
Total............	35,022	33,742	68,764

The male births were 50·93 per cent. of the total number, and in proportion to the female births, were as 100 to 103·8; the female births were 49·07 per cent. of the total number, and, in proportion to the male births, were as 96·3 to 100. As, in the same years, there were 65,030 deaths, the births exceeded the deaths by 3,734 or $\frac{1}{18}$. On comparing the births and deaths of each sex, the following results appear:—

Male births................	33,113
„ deaths	29,568
Excess of male births	3,545

Female deaths................	32,475
„ births................	31,903
Excess of female deaths	554

During the six years from 1786-91, 278 were illegitimate in 4,352 births, about $\frac{1}{15}$.

From 1695 to 1791, in periods of twenty years, the average annual proportion of the births to the population was as follows:—

Periods.	Average Population.	Births.	
		Annual Average.	Annual Proportion.
1695 to 1710........	17,700	646	1 in 27
1711 „ 1730........	20,000	667	„ 30
1731 „ 1750........	21,500	677	„ 31
1751 „ 1770........	23,500	781	„ 30
1771 „ 1791........	25,000	756	„ 33

In the seven years from 1806 to 1812, the following was the number of births:—

Males.			Females.			Total.
Legitimate.	Illegitimate.	Abandoned.	Legitimate.	Illegitimate.	Abandoned.	
1,732	177	170	1,643	184	147	4,053

To an average population of 23,250, during this period (1806 to 1812), the births were in the proportion of 1 in 40, on an annual average.

The illegitimate and abandoned were, to the total births, in the proportion of 1 in 6. But Geneva at that period was a garrison-town, and also the chief town of the department of Leman, and therefore received the foundlings of that district. After the Restoration the number of such births rapidly decreased.

The following table shows the number of births in each year from 1814 to 1833.

Years.	Males.			Females.			Total.	Illegitimate Births, per Cent.
	Legitimate.	Illegitimate.	Total.	Legitimate.	Illegitimate.	Total.		
1814	231	48	279	193	42	235	514	17·51
1815	204	35	239	202	34	236	475	14·52
1816	215	28	243	209	32	241	484	12·39
1817	224	27	251	215	31	246	497	11·67
1818	216	37	253	236	22	258	511	11·54
1819	238	34	272	203	27	230	502	12·15
1820	224	35	259	254	43	297	556	14·03
1821	226	24	250	235	32	267	517	10·83
1822	260	29	289	224	28	252	541	10·53
1823	247	34	281	205	30	235	516	12·40
Total	2,285	331	2,616	2,176	321	2,497	5,113	12·75
1824	265	23	288	224	29	253	541	9·61
1825	289	23	312	245	21	266	578	7·61
1826	268	18	286	213	27	240	526	8·55
1827	283	25	308	262	24	286	594	8·25
1828	272	18	290	252	14	266	556	5·75
1829	278	26	304	259	23	282	586	8·36
1830	289	21	310	272	20	292	602	6·81
1831	293	25	318	279	27	306	624	8·33
1832	312	18	330	227	18	245	575	6·67
1833	294	22	316	296	18	314	630	6·35
Total	2,843	219	3,062	2,529	221	2,750	5,812	7·57
General Total	5,128	550	5,678	4,705	542	5,247	10,925	9·99

The average annual number of births was—

In the first 10 years		511
In the last 10 years		581
In the 20 Years	Males 284	546
	Females 262	

The proportion of the illegitimate to the total births was, in the first 10 years, 12·75 per cent., or about $\frac{1}{8}$; in the last 10 years, 7·57, or about $\frac{1}{13}$; and in the 20 years 9·99 per cent. In France, from 1815 to 1833 the per centage was 7·01; at Paris it was 35·81. As illegitimate births are always more numerous in towns than in the country, and as their proportion in the town of Geneva exceeds only by $\frac{2}{5}$ their proportion in the kingdom of France, these results are not unfavourable.

The births increased during the second decennial period, from 1824 to 1833, 13·6 per cent., which corresponds with the population increase of 12·5 per cent. The proportion of births to the population during the 20 years, was, on an average, 1 in 46·86; whereas at the beginning of the nineteenth century it was 1 in 40.

We have the following numbers and proportions for the births of each sex:—

	1814 to 1833.		
	Total Number.	Per Centage.	Proportions.
Males	5,678	51·9725	100 to 108·21 or 13
Females	5,247	48·0275	92·39 to 100 or 12
	10,925	100·0000	

The relative proportions varied considerably in different years, as in 1818-20-21, more females than males were born. On the contrary, in 1832, the males predominated by 57 per cent.

The predominance of the males was stronger in the last ten years 1824 to 1833, than in the preceding ten, 1814 to 1823, in the proportion of 52·684 to 51·163 per cent.

On the average, 13 males were born to 12 females.

It has been remarked that a considerable difference exists in the relative proportion of the sexes in legitimate and illegitimate births; and the comparative greater excess of the males in legitimate births, is strikingly shown in the table at page 306, from which are derived the following numbers and proportions:—

		1814 to 1833.		
		Total Number.	Per Centage.	Proportions.
Legitimate	Males	5,128	52,151	100 to 108·99
	Females	4,705	47,849	91·75 to 100
		9,833	100,000	
Illegitimate	Males	550	50,366	100 to 101·48
	Females	542	49,634	98·54 to 100
		1,092	100,000	

The difference, therefore, between the males and females is in proportion of 12 to 11 in legitimate births, and 69 to 68 in illegitimate.

	Per Cent.
Of the 1,092 illegitimate children born, from 1814 to 1833, 119 were abandoned, and both parents were unknown,	or 10·90
Of the 119 abandoned, 4 only were acknowledged by the mothers, and none by the fathers.	
The females were abandoned more frequently than the males, in the proportion of 6 to 5.	
The mothers of 973 of the 1,092 children were known, and designated in the registers.	
Carried forward	10·90

	Per Cent.
Brought forward	10·90
243 children were merely acknowledged by the fathers, generally at the time of registration	22·25
117 children were legitimated by subsequent marriages	10·71
The number of males and of females who were acknowledged and legitimated was nearly equal.	
The fathers of 613 of the 973 housed, or not abandoned children, remained unknown	56·14
	100·00

From these figures, we may presume, that of 10 illegitimate children, about $\frac{1}{9}$ is altogether abandoned, $\frac{2}{9}$ acknowledged, $\frac{1}{9}$ is legitimated, and $\frac{5}{9}$ have mothers only as legal parents. The fathers are known only in $\frac{1}{3}$ of the cases.

The following table exhibits the number of still-births, legitimate and illegitimate, in each year, from 1814 to 1833:—

Years.	Legitimate.		Illegitimate.		Total.	Proportion to Births.
	Males.	Females.	Males.	Females.		
1814	11	6	4	....	21	$\frac{1}{24}$
1815	11	9	....	....	20	$\frac{1}{23}$
1816	14	7	4	3	28	$\frac{1}{17}$
1817	18	10	7	2	37	$\frac{1}{13}$
1818	15	6	4	2	27	$\frac{1}{13}$
1819	23	15	3	4	45	$\frac{1}{11}$
1820	23	18	6	5	52	$\frac{1}{11}$
1821	14	9	5	3	31	$\frac{1}{16}$
1822	15	18	3	5	41	$\frac{1}{13}$
1823	20	15	3	1	39	$\frac{1}{13}$
Total	164	113	39	25	341	$\frac{1}{15}$
1824	18	10	2	5	35	$\frac{1}{15}$
1825	13	6	....	2	21	$\frac{1}{27}$
1826	14	11	1	3	29	$\frac{1}{18}$
1827	11	14	3	3	31	$\frac{1}{19}$
1828	8	12	3	4	27	$\frac{1}{20}$
1829	16	10	2	2	30	$\frac{1}{19}$
1830	17	9	3	3	32	$\frac{1}{19}$
1831	12	15	3	5	35	$\frac{1}{18}$
1832	9	11	8	6	34	$\frac{1}{17}$
1833	15	9	3	4	31	$\frac{1}{20}$
Total	133	107	28	37	305	$\frac{1}{19}$
General Total	297	220	67	62	646	$\frac{1}{17}$

In the first 10 years, the annual average was 34 still-births, or $\frac{1}{15}$ of the births; in the second 10 years, 30, or $\frac{1}{19}$; and in the 20 years (males 18, females 14), 32, or $\frac{1}{17}$, or 1 still-birth in 800 inhabitants. The annual variation in the numbers was considerable.

The decrease of still-births in the second decennial period was 10·95 per cent., which, as the population had increased, is a result due, in a great measure, to improved midwifery.

To the total number of still-births, the legitimate and illegitimate were as follow:—

	Total Number.	Per Centage.
Legitimate	517	80·03 or 4
Illegitimate	129	19·97 or 1
	646	100·00

From 1814 to 1833, there were 9,833 legitimate births and 517 legitimate still-births, which is 1 in 19·0 births, or 20 conceptions; in the same period, there were 1,092 illegitimate births and 129 illegitimate still-births, or 1 in 8·4 births, or 9·4 conceptions. Hence the proportion of still-births amongst illegitimate children was double that amongst legitimate; so that the chance of not being born alive was twice as great for the illegitimate as it was for the legitimate. This result may have sprung from a variety of causes which are generally connected with illegitimate pregnancy.

In the still-births, the following was the relative proportion of the sexes:—

	Total Number.	Per Centage.	Proportion.
Males	364	56·347	100 to 129·07 or 40
Females	282	43·653	77·47 to 100 or 31
	646	100·000	

To the legitimate still-births, the proportion of each sex was—

	Total Number.	Per Centage.	Proportion.
Males	297	57·45	100 to 135
Females	220	42·55	74·07 to 100
	517	100·00	

And to the illegitimate—

	Total Number.	Per Centage.	Proportion.
Males	67	51·94	100 to 108
Females	62	48·06	92·5 to 100
	129	100·00	

It will be observed that the excess of illegitimate male children was alike small in the births and still-births.

The number of males who were still-born was greater than the number of females, in the proportion of 4 to 3. The male child, therefore, was exposed, either in the womb or at the moment of birth, considering the size of its head and body, to many more casualties than the female. This inferior vitality continues, but in a decreasing ratio, during the life of the male.

The following were the proportions of the still-births to the births:—

1 male still-born in	15·59	male births, or	16·69	male conceptions
1 female	,,	18·60	female	,,	19·60 female	,,
1 child	,,	16·91		,,	17·91	,,

or 1 child still-born in 18 confinements.

The number of living and still-births is next given, together with the per-centage proportions of each.

	Total Number.	Per Centage.		Total Number.	Per Centage.
Males living	5,678	93·98	Females living	5,247	94·90
,, still-born	364	6·02	,, still-born....	282	5·10
,, conceived	6,042	100·00	,, conceived....	5,529	100·00

	Total Number.	Per Centage.
Children living	10,925	94·417
,, still-born	646	5·583
,, conceived........	11,571	100·000

If, in order to arrive at the actual proportion of the sexes at the time of conception, we add the infants born alive to the still-born, we shall obtain the following results:—

			Total Number.	Per Centage.	Proportion.
Legitimate	Males born alive	5,128	5,425	52·415	100 to 110·15 or 11
	,, still-born	297			
	Females born alive	4,705	4,925	47·585	90·78 to 100 or 10
	,, still-born	220			
			10,350	100·000	
Illegitimate	Males born alive	550	617	50·532	100 to 102·15 or 51
	,, still-born	67			
	Females born alive	542	604	49·468	97·89 to 100 or 50
	,, still-born	62			
			1,221	100·000	
Total	Males born alive	5,678	6,042	52,217	100 to 109·28 or 12
	,, still-born	364			
	Females born alive	5,247	5,529	47,783	91·51 to 100 or 11
	,, still-born	282			
			11,571	100·000	

Consequently, at the time of conception, there were 12 males conceived to 11 females.

The next table relates to Twin-births, from 1814 to 1833:—

Years.	Two Males.	Two Females	Male and Female	Legitimate.	Illegitimate.	Total.	Males.		Females.	
							Born Alive.	Still-born.	Born Alive.	Still-born.
1814	....	....	1	1	....	1	1	....	1	....
1815	1	2	1	3	1	4	1	2	4	1
1816	2	5	4	10	1	11	6	2	12	2
1817	2	2	2	6	....	6	5	1	5	1
1818	3	5	3	8	3	11	4	5	11	2
1819	2	2	3	6	1	7	5	2	7	....
1820	2	3	3	6	2	8	6	1	8	1
1821	4	2	1	7	....	7	5	4	5	....
1822	2	1	8	10	1	11	10	2	8	2
1823	3	2	3	7	1	8	7	2	6	1
1824	1	3	1	5	....	5	3	....	7	....
1825	3	1	1	5	....	5	7	....	3	....
1826	8	3	2	11	2	13	13	5	8	....
1827	1	2	1	4	....	4	2	1	1	4
1828	2	2	2	6	....	6	6	....	5	1
1829	2	3	3	7	1	8	6	1	7	2
1830	4	2	3	9	....	9	9	2	6	1
1831	2	2	10	13	1	14	11	3	10	4
1832	1	2	1	3	1	4	2	1	3	2
1833	2	8	4	13	1	14	5	3	19	1
Total	47	52	57	140	16	156	114	37	136	25

The average annual number of twin-births was 7·8.

To ascertain the proportion between the twin-births and the total births, the former must be deducted from the latter:—

Births and still-births	11,571
Twin-births	156
	11,415

And 156 twin-births to 11,415 births bear a proportion of 1 in 73. The Sexes were divided in the following way:—

	Total Number.	Per Centage.	Proportion.
Males	151	48·4	100 to 93·8 or 15
Females	161	51·6	106·6 to 100 or 16
	312	100·0	

In the total number of twin children, the excess of the females was very nearly equal to that of the males in the total births. Male twins occurred less frequently than female twins, and male and female twins were the most frequent.

The number and per-centage of the twin children born alive and still-born were—

	Total Number.	Per Centage.
Born alive	250	80·1 or 4
Still-born	62	19·9 or 1
	312	100·0

So that 1 twin-child in 5 was still-born; whereas, in single births, the proportion was as low as 1 in 18.

The still-births of the twins of each sex were—

	Total Number.	Per Centage.
Males	37	59·68 or 6
Females	25	40·32 or 4
	62	100·00

Therefore the proportion of male to female still-births was greater in the twin than in the single births.

The proportion of illegitimate births was the same in the twin and single births.

No Triple births occurred from 1814 to 1833.

With regard to the Deaths, M. Mallet has prepared a table which exhibits their annual number from 1551 to 1813, and from that table he has taken the following abstract, which furnishes us with the decennial number of the deaths, and their annual average during the same period:—

Periods.	Total Number.	Annual Average.	Periods.	Total Number.	Annual Averages.
1551—1560	4,951	495	1681—1690 ...	7,428	743
1561—1570	6,350	635	1691—1700	5,660	566
1571—1580	4,009	401	1701—1710	6,968	697
1581—1590	6,526	653	1711—1720	6,041	604
1591—1600	3,976	398	1721—1730	6,660	666
1601—1610	4,211	421	1731—1740	6,053	605
1611—1620	6,498	650	1741—1750	6,930	693
1621—1630	5,314	531	1751—1760	6,761	676
1631—1640	6,212	621	1761—1770	7,068	707
1641—1650	4,456	446	1771—1780	7,395	739
1651—1660	4,441	444	1781—1790	7,477	748
1661—1670	5,224	522	1791—1800	6,676	668
1671—1680	6,007	601	1801—1810	6,960	696

In the three years from 1811 to 1813, the deaths amounted to 1802, and the annual average to 601.

Considerable fluctuations will be observed in the consecutive averages, but this result is occasioned by superior causes, which tend to increase or decrease the mortality above or below the usual average. By taking the averages of longer periods, these differences will disappear. Thus, on every 50 years from 1551 to 1800, the averages successively would be 516, 536, 575, 653, and 707.

The progressive increase in the number of deaths, between the years 1551 and 1800, compared with the progressive increase of the population in the same period, will be found in the following table:—

Periods of 50 Years.	Average Population.	Annual Average of Deaths.	Proportionate Increase of Population.	Proportionate Increase of Deaths.	Difference in the Increase of Population and Mortality, or Diminution of Deaths.	Average Rate of Deaths.	Decrease in Rate of Death.
1551—1600	13,000	516	100.	100	....	1 in 25	....
1601—1650	14,500	536	111	104	7	„ 27	2
1651—1700	16,000	575	123	110	13	„ 28	1
1701—1750	19,500	653	150	126	24	„ 30	2
1751—1800	24,000	707	185	137	48	„ 34	4

Thus, during two centuries and a half, while the population increased in the ratio of 100 to 185, the deaths only increased in the proportion of 100 to 137; therefore the difference of 48 between these two proportions, was the decrease in the general mortality. In the sixteenth century, 1 individual in 25 died annually; whereas, in the eighteenth, there died but 1 in 34, which is an increase of 9 in the proportionate number of individuals to 1 death in the year.

The next table comprises the number of deaths and the aggregate ages of the persons who died in each year from 1814 to 1833.

Years.	Males.				Females.				Total.			
	Deaths.	Ages.			Deaths.	Ages.			Deaths.	Ages.		
		Years.	Mths.	Dys.		Years.	Mths.	Dys.		Years.	Mths.	Dys.
1814	294	11,566	7	5	370	16,005	2	21	664	27,561	9	26
1815	202	7,363	1	2	232	9,464	3	18	434	16,827	4	20
1816	219	9,674	1	16	277	12,782	1	18	496	22,456	3	4
1817	222	9,021	10	24	232	10,067	10	17	454	19,089	9	11
1818	217	7,545	7	22	299	11,477	7	5	516	19,023	2	27
1819	207	7,664	4	7	265	11,123	4	6	472	18,787	8	13
1820	239	9,788	5	14	276	12,647	4	5	515	22,435	9	19
1821	224	8,668	8	18	285	12,434	6	21	509	21,103	3	9
1822	272	10,050	0	3	280	11,372	5	29	552	21,422	6	2
1823	217	8,555	11	22	270	11,210	11	14	487	19,766	11	6
	2,313	89,888	10	13	2,786	118,585	10	4	5,099	208,474	8	17

Continued.

Years.	Males.				Females.				Total.			
	Deaths.	Ages.			Deaths.	Ages.			Deaths.	Ages.		
		Years.	Mths.	Dys.		Years.	Mths.	Dys.		Years.	Mths.	Dys.
1824	271	10,779	2	18	270	12,904	3	12	541	23,683	6	0
1825	276	10,253	0	9	270	12,128	8	29	546	22,381	9	8
1826	311	11,602	4	4	268	10,660	9	23	579	22,263	1	7
1827	290	10,072	9	22	297	11,737	10	0	587	21,810	7	22
1828	315	12,343	3	19	286	12,084	0	23	601	24,427	4	12
1829	269	10,785	8	0	284	13,096	9	24	553	23,882	5	24
1830	253	9,580	10	25	317	13,877	6	25	570	23,458	5	20
1831	273	10,577	11	22	287	12,776	9	27	560	23,354	9	19
1832	334	12,539	2	1	323	12,939	1	24	657	25,478	3	25
1833	317	12,374	8	8	302	12,185	9	17	619	24,560	5	25
	2,909	110,909	1	8	2,904	124,391	10	24	5,813	235,301	0	2
Total	5,222	200,797	11	21	5,690	242,977	8	28	10,912	443,775	8	19

During the first decennial period, on an annual average, 231 males and 279 females, or 510 of both sexes, died; in the last period, the numbers were 291 males and 290 females, or 581 of both sexes; and in the twenty years, the mortality consisted of 261 males and 284 females, or 545 of both sexes. It will be observed that, in the first period of 10 years, the deaths of the females exceeded the deaths of the males by $\frac{1}{6}$, whereas in the last 10 years the average mortality of the two sexes was almost equal.

The mortality increased 14 per cent. in the 10 years from 1824 to 1833, as a comparison of the total number of deaths in each of the two decennial periods will prove:—

1814 to 1823	5,099	100
1824 to 1833	5,813	114

This increase was in proportion to that of the births or of the population.

A reference to the last table will show that a considerable variation occurred in the number of the deaths in each of the years from 1814 to 1833, and this variation will be found to be greater than that in the number of the births. The amount of deaths in 1814 is, to that in 1815, as 3 to 2. But, with this exception, the difference between one year and another is not greater than $\frac{1}{7}$. A fatal fever appeared in the first months of the year 1814, and caused the deaths to exceed the births by 150, or $\frac{1}{161}$ of the population. This heavy mortality was confined to the first months of that year, as the number of deaths in the latter months was below the average. In the following year, 1815, the number of deaths was the smallest, and the births exceeded the deaths. However, the equilibrium between the births and the deaths was not restored until ten years after the ravages in 1814.

In the year 1832, we find an excess of 82 deaths over the births, which is accounted for, in a great measure, by the prevalence of epidemical small-pox.

In 1833 the deaths bore a proportion to the population of 1 in 46·92; a very favourable ratio, and equal, within a trifle, to that of births, 1 in 46·86.

With respect to the relative mortality of the two sexes, there has always been, in an aggregate of years, an excess in the deaths of females. Thus, from 1701 to 1813 there died—

	Number.	Proportion.
Females	40,427	100 to 110·2
Males	36,663	90·7 to 100

A similar result was apparent between 1814 and 1833.

	Number.	Proportion.
Females	5,690	100 to 108·9 or 13
Males	5,222	97·7 to 100 or 12

In this period, however, the excess arose in the first ten years, from 1814 to 1823, as from 1824 to 1833 the deaths of the males exceed the deaths of the females by 5. The difference in the number of deaths of each sex, from 1814 to 1833, will be seen in the succeeding table.

Years.	Excess of Deaths.		Years.	Excess of Deaths.	
	Males.	Females.		Males.	Females.
1814	....	76	1824	2	....
1815	....	30	1825	6	....
1816	....	58	1826	43	....
1817	....	10	1827	....	7
1818	....	82	1828	29	....
1819	....	58	1829	....	15
1820	....	37	1830	....	64
1821	....	61	1831	....	14
1822	....	8	1832	11	....
1823	....	53	1833	15	....
	....	473		105	100

The excess was not, therefore, constantly on the side of the females.

Having considered the actual mortality, and the relative number of deaths of each sex, our attention will now be directed to the fluctuation in the rate of mortality at different periods of life. Beginning from the birth we shall find that the first day of existence exhibits a very heavy mortality, and that only 1 infant in about 5 survives it. The second day is three times less fatal than the first, and the third is less dangerous in a twofold degree than the second. In subsequent days the mortality subsides less rapidly, but still as regularly. In fact, the first month is very fatal, as about one-half of the children who die in their first year are carried off during that period, which is eleven times more fatal than any subsequent month: 6·85 children in 100 births are dead at the expiration of the first month.

Between the first and second months the mortality decreases in the proportion of 4½ to 1, from the second to the third the proportion is 2 to 1, and 3 to 2 between the third and sixth months. The decrease is less perceptible in the last six months of the first year, in the course of which infants die in the proportion of 1 in 7·2 births.

The rate of mortality at subsequent periods of life may be seen in the following table, which exhibits, at different ages, the proportionate number of deaths, and of those who survive; with the number of individuals in proportion to 1 death, during the last part of the sixteenth century*, and in the seventeenth, eighteenth, and the first third of the nineteenth century†.

Ages.	Per Centage Proportions of Deaths.			
	Sixteenth Century.	Seventeenth Century.	Eighteenth Century.	Nineteenth Century.
1 year	25·92	23·72	20·12	15·12
2 years	8·40	6·99	4·85	4·34
3 ,,	4·67	5·05	3·55	2·32
4 to 5 years	5·36	5·24	4·64	2·62
6 ,, 10 ,,	7·59	6·60	5·75	3·63
11 ,, 15 ,,	4·52	3·68	2·48	2·50
16 ,, 20 ,,	4·65	3·86	2·69	3·30
21 ,, 25 ,,	3·74	3·67	3·28	3·85
26 ,, 30 ,,	5·28	3·90	3·25	3·47
31 ,, 40 ,,	9·28	7·64	6·64	6·54
41 ,, 50 ,,	6·25	7·31	7·34	8·46
51 ,, 60 ,,	5·76	7·39	9·47	11·56
61 ,, 70 ,,	4·50	6·89	11·41	14·35
71 ,, 80 ,,	2·90	5·61	10·01	12·47
81 ,, 90 ,,	0·95	2·08	4·02	4·96
Above 90 ,,	0·23	0·37	0·50	0·51
	100·00	100·00	100·00	100·00

Ages.	Per Centage Proportions of Survivers.			
	Sixteenth Century.	Seventeenth Century.	Eighteenth Century.	Nineteenth Century.
1 year	74·08	76·28	79·88	84·88
2 years	65·68	69·29	75·03	80·54
3 ,,	61·01	64·24	71·48	78·22
4 to 5 years	55·65	59·00	66·84	75·60
6 ,, 10 ,,	48·06	52·40	61·09	71·97
11 ,, 15 ,,	43·54	48·72	58·61	69·47
16 ,, 20 ,,	38·89	44·86	55·92	66·17
21 ,, 25 ,,	35·15	41·19	52·64	62·32
26 ,, 30 ,,	29·87	37·29	49·39	58·85
31 ,, 40 ,,	20·59	29·65	42·75	52·31
41 ,, 50 ,,	14·34	22·34	35·41	43·85
51 ,, 60 ,,	8·58	14·95	25·94	32·29
61 ,, 70 ,,	4·08	8·06	14·53	17·94
71 ,, 80 ,,	1·18	2·45	4·52	5·47
81 ,, 90 ,,	0·23	0·37	0·50	0·51
Above 90 ,,	....	....	....	....
	....	....	....	....

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* The last 41 years, with a few exceptions.

† The first 33 years.

Ages.	Number of Individuals to 1 Death.			
	Sixteenth Century.	Seventeenth Century.	Eighteenth Century.	Nineteenth Century.
1 year	3·85	4·21	4·97	6·61
2 years........................	8·81	10·91	16·47	19·55
3 „	14·07	13·72	21·13	39·02
4 to 5 years	11·38	12·26	15·40	29·85
6 „ 10 „	7·32	8·93	11·62	20·82
11 „ 15 „	10·62	14·24	24·63	28·78
16 „ 20 „	9·36	12·62	21·78	21·05
21 „ 25 „	10·39	12·22	17·05	17·19
26 „ 30 „	6·65	10·56	16·19	17·96
31 „ 40 „	3·21	4·88	7·44	9·00
41 „ 50 „	3·29	4·05	5·82	6·18
51 „ 60 „	2·49	3·47	3·75	3·79
61 „ 70 „	1·90	2·16	2·27	2·25
71 „ 80 „	1·40	1·43	1·45	1·44
81 „ 90 „	1·24	1·17	1·12	1·10
Above 90 „	....	....	....	....
	....	....	....	....

By comparing the mortality in the sixteenth and nineteenth centuries, we shall perceive that the proportionate number of deaths has decreased in the first and second years in the proportion of nearly 2 to 1; in the period from three to fifteen years of 3 to 1; from sixteen to twenty-five years of 2 to 1; from twenty-six to forty years of 3 to 1; and from forty-one to fifty years of 2 to 1. Between one and fifty years of age, therefore, the mortality of the present century has been two or threefold less than it was between the same ages in the sixteenth century. But from the age of fifty-one to sixty the number of deaths has only decreased in the proportion of 1$\frac{1}{2}$ to 1; from sixty-one to seventy, scarcely $\frac{1}{5}$; and between seventy-one and eighty the proportionate mortality of the two centuries only differs to the amount of $\frac{1}{35}$. After eighty years of age the sixteenth century has the advantage, as, from eighty-one to ninety, proportionably more individuals die in the nineteenth than was the case in the sixteenth century; the proportions of deaths at that period of life being 100 in 124 individuals in the sixteenth, and 100 in 109 in the nineteenth century, or $\frac{1}{9}$ in favour of the sixteenth century. Of 100 individuals at eighty years of age, there reached the age of ninety, 19·6 per cent. in the sixteenth; 14·9 per cent. in the seventeenth; 11 per cent. in the eighteenth; and 9·4 per cent. in the nineteenth century; so that the number of persons who live to ninety years of age has diminished, not on the absolute number of deaths, but on that of the individuals of eighty, upon whom the calculation should be made.

This diminished duration of life is even more perceptible above the age of ninety. In the sixteenth century, of 32 individuals at that age, 12 attained the age of 100, and 3 exceeded that term; a proportion of 0·468 at 100, or 100 in 213 at 90. In the seventeenth century, of 196 at 90, 37 lived to 100, and beyond it 16; a proportion of 0·270 at 100, or 100 in 369 at 90. In the eighteenth century, of 339 at 90 there were 12 alive at 100, and 15 also reached ages above 100: a proportion of 0·079 at 100, or 100 in 1250 at 90; and in the nineteenth century 103 at 90 give but 1 individual who attained the age of 101: a proportion of 0·009 at that age, or 1 who lived till then out of 103 at the age of 90. Therefore, of the number of individuals at the age of 90, nearly one-half lived to the age of 100 or beyond it in the sixteenth, more than one-fourth in the seventeenth, and one-twelfth in the eighteenth, but scarcely more than 1 in 100 exhibit that prolongation of life in the nineteenth century.

The figures of the probable duration of life lead to similar results, for we find, at the ages of 70 and 80, in the four centuries respectively, that the probable life was—

Years.	Sixteenth Century.	Seventeenth Century.	Eighteenth Century.	Nineteenth Century.
70................	7·03	7·18	7·93	6·76
80................	6·22	5·87	4·40	3·84

In each century, therefore, at the age of 70, the probable duration of life has remained very nearly the same; but at the age of 80, it has continually diminished.

The next table affords a comparison of the proportionate longevity in Geneva, and France and Belgium united.

Geneva (1814–33).	Years.	France and Belgium.—M. Burdach.	Years.
Of 2 individuals, one will attain....	45	Of 2 individuals, one will attain....	23
3 ,, ,, ...	60	3 ,, ,, ...	48
4 ,, ,, ...	66	4 ,, ,, ...	58
5 ,, ,, ...	69	5 ,, ,, ...	63
6 ,, ,, ...	72	6 ,, ,, ...	67
		7 ,, ,, ...	70
		8 ,, ,, ...	72
7 ,, ,, ...	73	9 ,, ,, ...	73
8 ,, ,, ...	74	10 ,, ,, ...	74
9 ,, ,, ...	75	11 ,, ,, ...	75
10 ,, ,, ...	76	12 ,, ,, ...	76
11 ,, ,, ...	77	13 ,, ,, ...	77
12 ,, ,, ...	78	14 ,, ,, ...	78
14 ,, ,, ...	79	16 ,, ,, ...	79
17 ,, ,, ...	80	18 ,, ,, ...	80
20 ,, ,, ...	81	21 ,, ,, ...	81
22 ,, ,, ...	82	25 ,, ,, ...	82
28 ,, ,, ...	83	30 ,, ,, ...	83
37 ,, ,, ...	84	36 ,, ,, ...	84
48 ,, ,, ...	85	43 ,, ,, ...	85
64 ,, ,, ...	86	51 ,, ,, ...	86
82 ,, ,, ...	87	60 ,, ,, ...	87
102 ,, ,, ...	88	70 ,, ,, ...	88
138 ,, ,, ...	89	100 ,, ,, ...	89
194 ,, ,, ...	90	120 ,, ,, ...	90
222 ,, ,, ...	91	170 ,, ,, ...	91
320 ,, ,, ...	92	250 ,, ,, ...	92
363 ,, ,, ...	93	350 ,, ,, ...	93
518 ,, ,, ...	94	500 ,, ,, ...	94
727 ,, ,, ...	95	700 ,, ,, ...	95
1,090 ,, ,, ...	96	1,000 ,, ,, ...	96
2,180 ,, ,, ...	97	1,400 ,, ,, ...	97
5,453 ,, ,, ...	98	1,900 ,, ,, ...	98

Some interest attaches itself to the preceding table, which shows out of how many men born at the same time the different ages will be reached by one of their number. It is divided into three periods, the first of which is termed the *normal duration of life:* the numbers of men increase regularly by unities, and the ages in a contrary manner. The second is considered as the *normal epoch of mortality:* the numbers of men, and the ages, increase together regularly, and by unities. The third is called *an un-normal epoch:* the numbers of men increase largely and without regularity, and the ages by unities, and in continuity.

According to this table, Geneva has a superiority over France and Belgium up to the age of 83, which embraces $\frac{97}{100}$ of her population.

Let us now proceed to investigate the causes of the prolongation of life in the greater part of the several ages, and of the diminution in the term of existence of individuals who have attained an advanced age.

We have already stated that the mortality during the first year is now twofold less heavy than it was in the sixteenth century. Amongst the general causes of this result, we may class the diminished fruitfulness of marriages, and the more general nursing of children by their mothers. But as these causes only develope themselves gradually, the result, if due to them alone, should have gradually appeared also; and this has not been the case; for the diminution, which was scarcely one-third from the sixteenth to the eighteenth century, only became of importance in the beginning of the nineteenth. It appears that this sudden improvement may be mainly attributed to vaccination, the introduction of which is about contemporary with the present century. And in confirmation of the good which has flowed from that precious discovery of Jenner, we have seen that, since the period of its introduction, the mortality between the ages of 3 and 10 years has decreased, in a threefold degree, to what it was in the sixteenth century; and it is at that period of life that the small-pox is the most fatal. Davillard has shown that 25 in 26 deaths by that disease occur during the first ten years.

If the mortality in early childhood has been so considerably diminished by a medical discovery, and if art cannot proportionably influence it in later years, it follows that the improvement effected in early life will not be succeeded by a corresponding good progress at more advanced ages, and, therefore, that the mortality which happens in the early periods of life will not be a proper criterion by which to compare the mortality, at different ages, of distinct populations, or even of one and the same population. And this is exemplified by what has occurred at Geneva from the eighteenth to the nineteenth century. The diminution of mortality in the nineteenth century was very considerable during the first 10 years of life, and very feeble between 10 and 30 years. In the eighteenth century, from the birth to 10 years, 1 infant died in 2·57; in the nineteenth, 1 in 3·57: and from 10 to 30 years, in the eighteenth century, 1 in 5·22; and 1 in 5·48 in the nineteenth. The improvement in the latter period is barely one-seventh of that in the former. The increase of the average life from the eighteenth to the nineteenth century is also inferior in comparison with the diminution of the mortality in the first year.

This example proves that longevity should be compared with human life in the aggregate, in the periods or countries to be investigated, as the comparison will not be so accurate if it is founded on a particular epoch of life.

From one century to another, the proportionate mortality between the ages of 10 and 50 years has continued to decrease regularly and progressively. The principal causes which have contributed to so desirable a result are, doubtless, the spread of better means, the improved knowledge of medical treatment, larger, better-ventilated, and more suitable dwellings, more wholesome and more abundant food, the cessation of fearful pestilences, and the precautions taken against them, and an improved and better-regulated mode of living.

It is a great advantage that the superior vitality has appeared at the most important age, and that thereby a larger number of individuals survive the period of childhood, and attain an age when they can direct their powers to promote the general welfare.

Old age, however, has not participated in the prolongation of life. Instead of gradually advancing to a patriarchal term, it has retrograded in the scale of existence, and the number of its years has decreased.

A comparison of the relative numbers of the births and deaths is of importance in vital statistics, and the following table provides information on that part of the subject:—

Years.	Males.		Females.		Total.	
	Excess of Births.	Excess of Deaths.	Excess of Births.	Excess of Deaths.	Excess of Births.	Excess of Deaths.
1814........	....	15	....	135	....	150
1815........	37	....	4	....	41	....
1816........	24	....	....	36	....	12
1817........	29	....	14	....	43	....
1818........	36	....	....	41	....	5
1819........	65	....	....	35	30	....
1820........	20	....	21	....	41	....
1821........	26	....	....	18	7	....
1822........	17	....	....	28	....	11
1823........	64	....	....	35	30	....
1824........	17	....	....	17	....	....
1825........	36	....	....	4	32	....
1826........	....	25	....	28	....	53
1827........	18	....	....	11	7	....
1828........	....	25	....	20	....	45
1829........	35	....	....	2	33	....
1830........	57	....	....	25	32	....
1831........	45	....	19	....	64	....
1832........	....	4	....	78	....	82
1833........	....	1	12	....	11	....
Total....	526	70	70	513	371	358

In the twenty years, the births were in excess twelve, and the deaths seven years, and in one year (1824) their numbers were equal. In the case of the males, the births generally surpassed the deaths;

and with the females, the contrary happened as frequently. The total births of the males exceeded their deaths by 456; the total deaths of the females exceeded their births by 443; and the total births of both sexes exceeded their deaths by 13.

It is curious to observe that, in Geneva, as well as elsewhere, more males than females are born, and that more females than males die. This contradictory result happens in equal proportions, thus:

Births.			Deaths.		
Males	108·2	or 13	Females	108·9	or 13
Females	100	12	Males	100	12

and is accounted for by the emigrations and immigrations, the males taking the chief part in the former, and the females in the latter. The trifling excess of births which is shown in the preceding paragraph, must, should it continue so small, lead to a stationary population. But a population never remains completely in *statu quo;* and in Geneva, formerly, there was an excess of births over the deaths, which at first diminished, and now has nearly vanished. This circumstance helps to prove how feeble are the calculations by which the period when a population will be doubled is attempted to be fixed. Such attempts might raise the supposition that fecundity, longevity, mortality, and the relation of births to deaths, follow an identical course in a long series of years; but this is never the case.

A very dense population has an inferior fecundity, and a population not very fruitful has a low rate of mortality.

If, in order to ascertain the time when the population of Geneva would have doubled, a calculation had been made on the excess of births, from 1695 to 1740, three centuries and a-half would have been named as the period required. But had the diminished excess between 1786 and 1791 been taken for the basis of such a calculation, more than seven centuries would have been necessary for the realisation of the desired result. At present the births and deaths are nearly equal in number, and the population of Geneva exceeds, by one-half, its amount at the beginning of the eighteenth century. The stagnation in the movement of a population represents the condition of a town where there is scarcely proper space for the inhabitants, where the population is abundant, and where the fecundity of marriages is reduced to its minimum.

A comparison of the general prosperity of the Genevese, with their great longevity, will serve to strengthen the hypothesis of Muret, that "the duration of life in each country is in an inverse ratio to the fecundity." And this position was maintained by M. d'Ivernois, who remarked that "long life in men is accompanied by a comparatively small number of births; and by such a ratio of births the complement of the human race is preserved and its welfare promoted."

From the statements concerning the mortality, we may obtain some interesting and valuable information respecting the average duration of life. On this subject approximate figures are too frequently brought forward, and in this way: if a table indicates 100 deaths between 20 and 30 years of age, 25 years are given as the average duration of life; but this calculation is not sufficiently precise, and the following observations are founded on the actual duration, in years, months, and days, of the lives of the individuals who died.

	Y.	M.	D.
Of 5,222 males that died from 1814 to 1833, the ages of 3 were not known; the remaining 5,219 lived, in the aggregate, 200,797 years, 11 months, and 21 days, giving an average life of	38	5	21
Of 5,690 females that died in the same period, the ages of 2 were not known; the other 5,688 lived, in the aggregate, 242,977 years, 8 months, and 28 days, giving an average life of	42	8	28
10,907 individuals of both sexes lived 443,775 years, 8 months, and 19 days, giving an average life of	40	8	7

In the registers of this mortality the ages of the adults are generally represented by the number of years completed, while fractional parts of the years are neglected. Were we, on this account, to add 3 months 23 days to the average life of the two sexes when taken together, 41 years would then represent the average life. For a town population this average of the duration of life is considerable. In 1766, Muret estimated the average life in the Pays de Vaud, where the population is chiefly agricultural, at 35 years and 5 months.

Hitherto, in Geneva, the average of life has progressively increased in duration, and the following table sets forth the progress from the end of the sixteenth century to the year 1833.

Periods.	Males.			Females.			Averages of both Sexes.			Centesimal Increase.
	Y.	M.	D.	Y.	M.	D.	Y.	M.	D.	
End of 16th Century	....		....	....		....	21	2	20	100
17th Century	....		....	....		....	25	8	2	120
1701 to 1750	29	2	26	35	8	22	32	7	22	153
1751 „ 1800	31	10	12	36	11	17	34	6	11	162
1801 „ 1813	35	0	29	41	5	25	38	6	0	181
1814 „ 1833	38	5	21	42	8	18	40	8	7	191

The increase in the seventeenth century was considerable, but it became much greater in the eighteenth and nineteenth centuries. During the ten years from 1824 to 1833 the average duration of life was rather lower than in the ten years from 1814 to 1823, as the following figures will show:—

	Males.			Females.			Average.		
	Years.	Mths.	Days.	Years.	Mths.	Days.	Years.	Mths.	Days.
1814 to 1823	38	10	28	42	7	4	40	11	2
1824 „ 1833	38	1	15	42	10	0	40	5	22
Difference	−0	9	13	+0	2	26	−0	5	10

As the decrease happens only in the case of the males, it may be a usual rather than a casual variation.

The average duration of life varies, to some extent, in different years. Between the years of the highest and lowest averages for both sexes, the difference amounted to rather more than nine years; but in consecutive periods the averages are more regular, and the differences trifling. Thus, from 1814 to 1833, in periods of five years, the averages of the duration of life were—

	Years.	Months.
1814 to 1818	41	....
1819 ,, 1823	40	10
1824 ,, 1828	40	1
1829 ,, 1833	40	9

Greatest difference................ 11 months.

Notwithstanding the common notion that the stronger of the two sexes possesses a superior vitality, the fact that the superiority belongs to the weaker sex, has long been observed, and frequently exhibited in the mortality-tables of many writers. In the table of M.M. Cramer and Joly, which relate to Geneva during the eighteenth century, the following result appears:—

35,603 females died, who had lived, in the aggregate, 1,294,914 years; their average life was	36·37 years.
32,376 males died, who had lived, in the aggregate, 990,995 years; their average life was	30·60 ,,
Difference in favour of the females	5·77 ,,

This law has continued to operate since that period, but to a less though varying extent, in different years. From 1814 to 1833 the average life of each sex was—

	Years.	Mths.	Days.		
Females	42	8	18	....	111 to 100
Males	38	5	21	....	100 ,, 90
The difference being....	4	2	27		

It is a vain endeavour to explain this phenomenon, as some authors do, by describing the life of men as more boisterous, more subject to the influence of destructive agents, as burdened with the wearying labours of life, excited by political passions, exposed to the hazards of warfare, the dangers of the ocean and other perils, and encompassed with a crowd of passions in every stage of excess; for if we carefully investigate the superior vitality of females, we shall discover that its superiority is at the highest point before birth, as only 77 females to 100 males are still-born, that it is still strong in the first year, and that it gradually lessens and becomes unimportant in the adults, so that the phenomenon is scarcely perceptible at the age when the above pernicious causes would begin to exert an influence. But, without asserting that they have no kind of connection with this phenomenon, we may infer that it springs from a primeval law of our nature, from a predisposition in our first being, from the peculiar constitution of each sex, and from the destiny decreed by the Almighty.

The average superior vitality of the female is represented by very nearly the same figures which show the proportionate excess in the conception of males. Thus—

Average life of females	100	Conception of males	100
„ males	90	„ females	91·5

Having considered the *average* duration of life, we proceed to notice the *probable* duration of life, which the following figures will determine for the period from 1814 to 1833:—

	Y.	M.	D.
Of 5,222 males who died, the ages of 5,219 were known; 2,609½ is the half of the latter number; at 41 years, 2,600 were dead; at 42 years, 2,634; their probable life was therefore	41	3	10
Of 5,690 females who died, the ages of 5,688 were known; 2,844 is the half of the latter number; at 48 years, 2,816 were dead; at 49 years, 2,871; their probable life was therefore	48	6	3
Of 10,912 males and females who died, the ages of 10,907 were known; 5,453½ is the half of the latter number; at 45 years, 5,466 were dead; at 46 years, 5,539; their probable life was therefore	45	0	29

The increase in the probable duration of life, from the end of the sixteenth century to 1833 appears in the next table.

Periods.	Probable Duration of Life.			Proportionate Increase.
	Years.	Mths.	Days.	
End of the 16th Century	8	7	26	100
17th Century	13	3	16	153
1701 to 1750	27	9	13	321
1751 „ 1800	31	3	5	361
1801 „ 1813	40	8	....	470
1814 „ 1833	45	0	29	521

Although the figures for the first of the above periods are not, perhaps, sufficiently accurate to justify the conclusion that the probable duration of life was actually augmented five-fold in three centuries, yet a progressive increase is very apparent, and in a superior ratio to that of the increase of the average duration of life. The population of Geneva has doubled its numbers in three centuries, but the advance of its real and productive value, in the same period, has more than doubled the numerical increase.

A difference in the probable duration of life occurred between the ten years from 1814 to 1823, and the ten years from 1824 to 1833. In these two decennial periods, the probable life was—

	Males.			Females.			Average for both Sexes.		
	Years.	Mths.	Days.	Years.	Mths.	Days.	Years.	Mths.	Days,
1814 to 1823	43	2	18	48	18	16	45	10	17
1824 „ 1833	39	7	0	49.	0	0	44	6	6
Difference	−3	7	18	+0	10	16	−1	4	11

During the last of these periods, the probable life of the females increased, whilst that of the males decreased—a result similar to tha- in the average life, but more prominent in this instance. But calculat tions respecting the probable life should be based on numerous observations during a series of years, as the figures relating to it vary, in different years, in twice as great a proportion as the figures which relate to the average life.

According to the mortality-tables of Geneva for the eighteenth century,

	Years.
The probable life of females was	32·60
„ of males	25·76
Superiority of the females	6·84

This superiority still exists, and from 1814 to 1833 it was found to be in the following proportion:—

	Years.	Mths.	Days.	Proportions.
Probable life of females	48	6	3	117·5 to 100
„ of males	41	3	10	100 „ 85
Superiority of the females	7	2	23	

As a further illustration of the superior vitality of females, we may add that this superiority, which is very great at the birth, suffers a decrease of one-half at the age of 1 year; that it remains nearly stationary from 5 to 20 years; from 20 to 30 years, it is a third less; at 40 years, it does not amount to more than 15 months; at 60 years, it is very trifling; and at 70 years, it is scarcely perceptible. The aged of both sexes appear to possess nearly an equal chance of living a few years beyond three-score-and-ten.

The following table exhibits the amount of the female's superior average life and probable life at different periods, from the birth to 70 years of age:—

Periods.	Average Life.	Probable Life.
	Years.	Years.
At the birth	7·23	4·24
„ 1 year	3·10	2·19
„ 5 years	2·90	1·83
„ 10 „	2·89	1·92
„ 20 „	2·39	2·10
„ 30 „	1·52	1·32
„ 40 „	1·29	1·23
„ 50 „	1·26	0·98
„ 60 „	0·92	0·62
„ 70 „	0·19	0·35

The following few calculations, founded on what has preceded, may not be uninteresting:—At or about the sixth month of pregnancy, it is 72 to 1 that one child only will be born; 17 to 1 that the child will be born alive; and, if born alive, it will be 13 to 12 that the child will be a boy; and, if a boy, it will be 1 to 1 that he will live to 41 years 3 months; and should the child be a girl, it will be 1 to 1 that she will live to 48 years and six months.

At Geneva, the probable life was inferior to the average life, until the beginning of the present century, when the inferiority passed to the average life. From the sixteenth to the nineteenth century, the following were the respective amounts and proportions of the average and probable life :—

	Sixteenth Century.	Seventeenth Century.	Eighteenth Century.	1801 to 1833.
	Years.	Years.	Years.	Years.
Average	21·21	25·67	33·62	Probable.... 43·08
Probable	8·65	13·29	29·50	Average .... 39·69
Difference....	12·56	12·38	4·12	Difference 3·39
		Proportions.		
Average	245	193	114	92
Probable	100	100	100	100

From 1801 to 1813, the superiority of the probable over the average life was but 2 years and 2 months; between 1814 and 1833, it doubled, and was—

	Years.	Mths.	Days.		Proportions.
Probable...........	45	0	29	....	100 to 110·7
Average	40	8	7	....	90·2 to 100·0
Superiority....	4	4	22		

But this superiority of the probable life is not uniform at different periods of life; and, in fact, at a certain age, it ceases, and the average life takes the superiority, and maintains it, in a small ratio, to the end of life, as the following figures will prove—the plus sign signifying the superiority of the probable life, and the minus its inferiority to the average life :—

	Years.		Years.
At the birth....................	+ 4·40	At 35 years	+ 0·36
„ 1 year	+ 5·06	„ 39 „	— 0·02
„ 5 years	+ 4·05	„ 50 „	— 0·97
„ 10 „	+ 3·54	„ 60 „	— 1·29
„ 15 „	+ 3·20	„ 70 „	— 1·55
„ 20 „	+ 2·30	„ 80 „	— 1·38
„ 25 „	+ 1·63	„ 90 „	— 0·76
„ 30 „	+ 0·88	„ 95 „	— 0·63

The average life and the probable life, calculated from the birth, increase to a certain period, at which they respectively reach their maximum, and from thence they continually decrease, until the most advanced age is attained. From the birth, the average life increases until 3 years of age, when it is at its maximum of 47·53 years, and decreases at the age of 4. The probable life increases until 2 years of age, when it is at its maximum of 52·17 years, and decreases at the age of 3. No very great difference exists between these two maxima, and were they established on more extensive calculations, perhaps they would be more equal. Towards the fifth year, the average life, being on the decrease, equals the amount it was at the birth, and the probable life does the same between the third and fourth years. Some light may be thrown on the principle of this successive increase and decrease by the following illustration:—Let us suppose the occurrence of a large number of births at a certain period, and the majority of the children then born to be robust and healthy, and the minority to be weak and sickly. Now, in calculating the average life and the probable life, it is necessary to found the calculations on the number of the children who are born alive, including those who have actually breathed, if only for an hour (and in the calculations for the period between 1814 and 1833, only positive still-births have been excluded). But amongst the large number of new-born children there must be several who have but a precarious existence, and who die in a few days, or months, or at a very early age, either on account of bodily ailments or want of proper care. By including these in the calculations, we must evidently lower the average and probable rate of vitality which ought to represent the presumed longevity of healthy children, who are destined to live at least for some years.

As the sickly children die, so does the probable life of the healthy increase; and in consequence of many deaths taking place soon after birth, the probable life is subject to a rapid increase.

The probable life of a child who has lived 1 day is 14 months superior to that of a child just born; of a child 2 days' old, it is 20 months superior; and at 3 days' old, the child possesses a superiority of 2 years. At the end of the first month, the superiority is 4 years, and at the end of the first year, it is more than 6 years. The superiority does not cease until the second year, when the probable life is at its maximum, and the child has then gained 7 years. At this period, the young generation is entirely free from the early-doomed and ephemeral children.

During the increasing vitality, the child who lived a certain number of days or months, gained, not only the time of its existence between the inferior and superior age, but also the quantity by which the probable life of the superior exceeded the probable life of the inferior age.

Let us now investigate the period of decrease. It has before been observed that the average life continually decreased from 3, and the probable life from 2 years. But we may easily understand that a man by living one year of actual life, does not lose a whole year of his probable life. In advancing one year in his career, he has increased the age at which he will probably die, that is to say, that, although there remains in reality a less time for him to live than there was a year before, the time which probably remains for him to live, if added to the time he has already lived, will form a total superior to that of his probable life and age in the preceding year. This position will be made more clear by the following example:—The probable life of an individual at 21 years of age is 39 years and 1 month, which, with the 21 years already lived, make a total of 60 years and 1 month. At 22 years, the probable life is 38 years and 5 months, which, with the 22 years already lived, make a total of 60 years and 5 months. And i the age at which he will probably die had not increased in the year expired between the ages of 21 and 22, he would have had a probable life of only 38 years and 1 month at the latter age. Thus 4 months are gained or added to the aggregate life by living from 21 to 22 years of age. The advantage gained in the period of decrease is the time which expires between the inferior and the superior age, less the quantity by which the probable life of the superior age is below that of the inferior age.

The probable life, in its decrease, does not maintain a uniform rate. In the first years which follow the maximum of the probable life, the decrease is very feeble, and the advantage to vitality is proportionably very great. A child of 5 years of age has a probable life of only one year less than a child of 2 years, although the former has lived three years longer than the latter.

From 5 to 50 years the decrease of the probable life is more important and regular. During that period it decreases in the ratio of about 9 months to every year of life, which may be looked upon as an average annual gain of three months to the term of life. At the more advanced periods of life the decrease is not so considerable, as from 60 to 70 years the probable life is diminished only by 4 years and a-half, from 70 to 80 only by 3 years, and from 80 to 90 by no more than 8 months. Thus the more advanced in age a person becomes the less rapid is the rate of decrease in the probable number of years which separate him from the tomb. If from the age of 60 to 70 the rate of decrease were the same as it is from 30 to 40, an individual at the age of 70 would have a probable life of only 3·42 years; whereas at the age of 70, by the actual rate of decrease, a person possesses a probable life of nearly double that amount, or 6·76 years. Above 80 years the rate of probable life is nearly stationary: it is the same at the ages of 83, 84, 89, and even 92. At 84, 85, and 86 years of age the average life is the same. It results from these observations on the decrease of probable life, that it is greatest in the period of life between childhood and old age, and least in those two extreme periods of life.

As the maximum vitality does not appear until the removal of the ephemeral and early-doomed children, it follows that a diminished mortality of young children is marked by the nearer approach of the maximum vitality to the period of birth. The following table exhibits the relative proportions between the maximum vitality and the period of birth in the average life and the probable life at Geneva from the sixteenth century to 1813, and the like proportions, in the nineteenth century, for France and Belgium, according to Duvillard and Quételet, compared with the twenty years from 1814 to 1833.

		1814 to 1833.	1801 to 1813.	1761 to 1800.	1701 to 1760.	Seventeenth Century.	Sixteenth Century.	Nineteenth Century.	
								France.	Belgium.
Average	Birth........	1,000	946	826	806	631	521	706	790
	Maximum	1,000	1,000	947	897	773	644	904	....
Probable	Birth........	1,000	902	718	614	294	191	451	554
	Maximum	1,000	964	940	872	674	521	862	957

These figures are the proof of a considerable increase of vitality during three centuries, especially at the period of childhood.

In speaking of the vitality of the two sexes we have alluded to the superior vitality of the female, and in pursuing that subject we may remark that this superiority is very prominent during the first year. Thus, in the first day only 1 girl in 65 dies to 1 boy in 42; in the first month 1 girl in 17 to 1 boy in 13; and in the first year but 10 girls in 80 to 10 boys in 66. In the second year the difference, although on the decline, is still strongly marked on the contrary. From 6 to 8, and especially from 11 to 17 years, fewer boys than girls die; but from 19 years the superior vitality is again on the side of the girls, with slight variations. It is not until 21 years that the sexes become numerically equal. From that period the females predominate in proportion to the superior vitality which they then possess. At 21 years a man has an average life of 35·91 years, and a woman 37·81 years. In 100 births there remain, in proportion, at 50 years of age, 22·0675 men and 23·1776 women, which bear the same relative proportion, as 35·91 and 37·81.

The following table will show the relative mortality and vitality of each sex at different ages, in proportion to 100 births:—

Ages.	Males.		Females.	
	Mortality.	Vitality.	Mortality.	Vitality.
Birth	....	51·9725	....	48·0275
1 month	4·3319	47·6406	2·6348	45·3927
1 to 3 months	1·4043	46·2363	0·9116	44·4811
3 to 6 „	1·0358	45·2005	0·5830	43·8981
6 months to 1 year	1·7723	43·4282	1·3846	42·5135
Total of 1 year	8·5443	....	5,5140	
2 years	2·1911	41·2371	1·8236	40·6899
2 to 5 years	2·3502	38·8869	2·1531	38·5368
5 „ 10 „	1·7723	37·1146	1·7482	36·7886
10 „ 15 „	1·1954	35·9192	1·3337	35·4549
15 „ 21 „	2·3102	33·6090	1·9000	33·5549
21 „ 30 „	3·8937	29·7153	3·2255	30·3294
30 „ 40 „	3·3060	26·4093	3·1324	27·1970
40 „ 50 „	4·3418	22·0675	4·0194	23·1776
50 „ 60 „	6·0246	16·0429	5·6572	17·5204
60 „ 70 „	7·4991	8·5438	7·6498	9·8706
70 „ 80 „	5·9945	2·5493	6·8564	3·0142
80 „ 90 „	2·3700	0·1793	2·6934	0·3208
90 „ 99 „	0·1793	....	0·3208	....
	51,9725		48·0275	
	100 births.			

Here we observe that, between 60 and 70 years of age, males and females die in almost equal proportions; that at 90 a few more females survive than males; but that at 98 there remains but one male and one female who died at 99.

It has long been customary to divide human life into periods of infancy, youth, maturity, and old age; we will now consider how these classifications are confirmed by the probable duration of life. We have already stated that the presumed future vitality reached its maximum between 2 and 3 years of age: these are the years of infancy; and of 100 deaths 19·786 take place in that period. On emerging from infancy, at 3 years, the child has a probable life of 52 years, therefore the time which elapses between 3 and 55 years will be the period of usual or ordinary life, the term probably attained by the children of 3 years; the deaths in that period being 40·158 per cent. At 55 years of age the probable life is 15, therefore from 55 to 70 we shall enter the period of advanced life, during which period the deaths amount to 21·472 per cent. Beyond 70 years old age is encountered, and the remaining 18·584 per cent. disappear. The four periods of life will bear the following proportions to the general mortality:

3 first years, or infancy	19·786	per cent.
3 to 55 years, or ordinary life	40·158	,,
55 to 70 years, or advanced life	21·472	,,
Above 70 years, or old age	18·584	,,
	100·000	,,

One-fourth is removed at 8 years and 4 months (4 years and 10 months for the males and 12 years and 9 months for the females); one-half at 45 years (41 years and 4 months for the males, and 48 years 7 months for the females); and three-fourths are no more at 65 years and 10 months (64 years for the males, and 67 years for the females).

To show the number of individuals who were of an age to labour for themselves and others, M. Quételet, in 1834, produced the following proportions for the following countries: for every 100 individuals below 15 years there were, above that age:

In France	220	individuals.	In England	157	individuals.
Sweden	211	,,	Ireland	143	,,
Belgium	200	,,	United States	122	,,

The proportion at Geneva is much superior to any of the preceding, being 251 to 100.

We now approach the conclusion of our paper, and turn, in the last place, to the consideration of the influence of the seasons. It is well known that this influence is less felt in towns than in the country, as the inhabitants of the former can better protect themselves from variable temperatures. And in the case of Geneva, the population being engaged in handicrafts and manufactures, so that employment does not alter in different seasons; the reformed Protestant religion (which allows of no carnival, and permits marriage at all periods of the year) being that of nearly $\frac{5}{6}$ of the population; and as there exists no particular circumstance to exert a disturbing influence on the births, marriages, and deaths, their proportions should exhibit only such variations as are caused by solar and atmospheric influence. The first table contains the actual number of births from 1814 to 1833, according to the months in which they occurred, with proportions: each month is supposed to consist of thirty-one days.

Months.	Actual Numbers.	Proportions in each Month.	Above and below the Average.	Males, per Cent.	Females, per Cent.
January	959	1·0338	+ 0·0338	51·51	48·49
February	904	1·0702	+ 0·0702	53·65	46·35
March	1,028	1·1082	+ 0·1082	53·30	46·70
April	972	1·0828	+ 0·0828	52·98	47·02
May................	985	1·0619	+ 0·0619	54·11	45·89
June................	879	0·9792	− 0·0208	48·69	51·31
July	858	0·9249	− 0·0751	52·68	47·32
August............	894	0·9638	− 0·0362	53·58	46·42
September	875	0·9747	− 0·0253	49·60	50·40
October	863	0·9303	− 0·0697	49·59	50·41
November	806	0·8978	− 0·1022	51·11	48·89
December........	902	0·9724	− 0·0276	52·10	47·90
	10,925	12·0000			

According to seasons the proportions will be as follow:—

	Astronomical.				Atmospherical.		
Winter....	3·2122	of which are males	52·82	....	3·0764	of which are males	52·42
Spring	3·1239	,, ,,	51·92	....	3·2529	,, ,,	53·46
Summer..	2·8634	,, ,,	51·95	....	2·8679	,, ,,	51·65
Autumn..	2·8005	,, ,,	50·93	....	2·8028	,, ,,	50·10
	12·0000				12·0000		

It will be seen by the table that five of the months were above the average and seven below it.

The following is the monthly order of the fecundity, according to the above proportions, together with the months in which the conceptions occurred:—

Births.	March.	April.	February.	May.	January.
	1·1082	1·0828	1·0702	1.0619	1·0338
Conceptions.	June.	July.	May.	August.	April.

B.	June.	September.	December.	August.	October.	July.	November.
	0·9792	0·9747	0·9724	0·9638	0·9303	0·9249	0·8978
C.	September.	December.	March.	November.	January.	October.	February.

Although the difference between one month and another is not very great, as the most productive month exceeded the least productive only by $\frac{1}{5}$, periods of increase and decrease may still be observed, which divide the year into two great periods, in each of which there are four consecutive months, and into two small periods, in each of which there are but two consecutive months. The principal period of increase commences in December, and terminates in March, the month of the maximum of the births; the principal period of decrease is from April to July, the month of the secondary minimum of births; the secondary period of increase consists of August and September, the month of the secondary maximum; and the secondary period of decrease includes October and November, the month of the minimum of births. These periods will, therefore, stand thus:—

	December.	January.	February.	March.
Increase, principal period	0·9724	1·0338	1·0702	1·1082 (principal maximum.)
	March.	April.	May.	June.

	April.	May.	June.	July.	
Decrease, ,, ,,	1·0828	1·0619	0·9792	0·9249	(secondary minimum.)
	July.	August.	September.	October.	

	August.	September.	
Increase, secondary period	0·9638	0·9747	(secondary maximum.)
	November.	December.	

	October.	November.	
Decrease, ,, ,,	0·9303	0·8978	(principal minimum.)
	January.	February.	

The conceptions, less numerous in winter, begin to increase in March, reach the average in April, and continue to increase in May and June, when they arrive at their maximum. After June, they decrease a little, although in July and August they are numerous, and above the average. They fall considerably in October, rise again in November, and equal the numbers of March or September in December. A decrease occurs in January, and the minimum appears in February.

In proportion to the annual number, the conceptions were $\frac{528}{1000}$ in the six warm months, from April to September, and $\frac{472}{1000}$ in the six cold months, from October to March. The most productive period occurs between the vernal equinox and the summer solstice; the next in the productive order is between the summer solstice and the autumnal equinox; then that from the autumnal equinox to the winter solstice; and, lastly, as the least productive, the period between the winter solstice and the vernal equinox.

The per-centage proportions of the births of each sex, according to the months, has been given in the first table. With regard to the conceptions of each sex, if we add the still-births to the births, it will be seen that the average is rather exceeded during some months by the males, and during five months by the females. Thus:

	February.	August.	May.	March.	April.	December.	July.
Male excess....	54·04	53·88	53·83	53·44	53·26	52·83	52·38
	May.	November.	August.	June.	July.	March.	October.

	November.	January.	October.	September.	June.*
Female excess....	51·29	51·28	50·43	50·21	49·08
	February.	April.	January.	December.	September.

The movement in the monthly proportions, as regards the sexes, is not so regular as it is in the case of the general births. It furnishes us, however, with the inference that males are conceived in the greatest proportion in the months when the general conceptions are most numerous; and this occurs from May to August, when, in comparison with the months from December to March, the conceptions are as 22 to 21.

With respect to marriages, the influence exercised on them by the seasons is probably not very considerable, in consequence of their being more intimately connected with the human will; and, therefore, we have but little to observe in reference to marriages and the seasons of their occurrence.

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* June here appears to be below the average, if it is 50; and by taking 50, the excess would be 50·92 for the males, which is superior to the female excess in October and September.

The following table shows the total number of marriages from 1814 to 1833, classed according to the months in which they occurred, with proportions to mark the relation of the months to the marriages:—

Months.	Total Number.	Proportions for each Month.	Above and below the Average.
January	193	0·6288	– 0·3712
February	249	0·8895	– 0·1105
March	330	1·0752	+ 0·0752
April	356	1·1990	+ 0·1990
May	267	0·8700	– 0·1300
June	303	1·0198	+ 0·0198
July	324	1·0557	+ 0·0557
August	307	1·0003	+ 0·0003
September	302	1·0166	+ 0·0166
October	344	1·1208	+ 0·1208
November	338	1·1371	+ 0·1371
December	303	0·9872	– 0·0128
	3,616	12·0000	

It will be observed that the months in which there were the fewest marriages are the three coldest in the year, December, January, and February, and next to them the month of May. On the other hand, they were the most frequent in the autumnal months.

If a comparison is made of the monthly proportion of marriages and of conceptions, no particular relation will be found to exist between them; for April, although it is the first month with respect to the number of marriages, is but the fifth as regards the conceptions; and May, the last month but two for marriages, ranks as third for conceptions.

In considering the mortality relatively to the seasons, we shall find a considerable influence in operation, and that the deaths are affected in a greater degree than the births, inasmuch as there is a difference of one-third between the months of the highest and lowest mortality.

The variations between one month and another were more violent in former times than at present, owing to frequent epidemics. During the month of August 1648, there were 152 deaths, whereas in the same period of the previous year, there were but 27, and in the same period of the following year but 22. In like manner, 275 deaths occurred in August 1686, only 38 in the same month of the previous year, and no more than 50 in that month of the following year. Such differences in the rate of mortality appear most frequently and intensely in the summer months.

The following table sets forth the number of deaths, in periods from 1632 to 1833, arranged according to the months, with proportions to show the monthly variations.

Months.	1632 to 1700*.		1701 to 1743†.		1755 to 1800.		1814 to 1833.		Total‡.		Above and below the Average.
	Total Number.	Proportions.	Total Number.	Proportions.	Total Number.	Proportions.	Total Number.	Proportions.	Total Number.	Proportions.	
January	3,835	1·1424	2,648	1·1993	3,312	1·1248	1,077	1·1616	11,744	1·1551	+ 0·1551
February	3,251	1·0640	2,385	1·1861	3,150	1·1751	1,021	1·2093	10,589	1·1440	0·1440
March	3,524	1·0497	2,329	1·0548	3,347	1·1367	1,100	1·1864	11,127	1·0944	0·0944
April	3,254	1·0015	2,249	1·0525	3,242	1·1377	952	1·0610	10,520	1·0692	0·0692
May	3,347	0·9970	2,159	0·9778	2,724	0·9251	905	0·9761	9,878	0·9716	− 0·0284
June	2,788	0·8582	1,741	0·8148	2,485	0·8721	808	0·9005	8,408	0·8545	0·1455
July	2,813	0·8379	1,701	0·7704	2,322	0·7886	740	0·7981	8,154	0·8020	0·1980
August	3,624	1·0795	1,950	0·8832	2,609	0·8861	827	0·8919	9,657	0·9498	0·0502
September	3,415	1·0512	2,422	1·1336	2,829	0·9927	830	0·9255	10,165	1·0332	+ 0·0332
October	2,973	0·8856	2,297	1·0403	2,851	0·9683	839	0·9049	9,669	0·9510	− 0·0490
November	3,077	0·9472	1,993	0·9325	2,700	0·9475	816	0·9094	9,232	0·9383	0·0617
December	3,645	1·0858	2,108	0·9547	3,078	1·0453	997	1·0753	10,542	1·0369	+ 0.0369
	39,546	12·0000	25,982	12·0000	34,649	12·0000	10,912	12·0000	109,685	12·0000	....

* This period includes 67 years, as 1653 and 1657 are omitted. The deaths by pestilence have been deducted.

† A period of 40 years—1702, 1707, and 1734 are omitted.

‡ Reckoned on the preceding columns, with the addition of the deaths for the 11 years, 1801 to 1811.

The proportions, according to seasons, will be—

	Astronomical.	Atmospherical.
Winter	3·3935	3·3160
Spring	2·8953	3·1352
Summer	2·7850	2·6063
Autumn	2·9262	2·9225
	12·0000	12·0000

It will be found, in the different periods comprised in the preceding table, that from 5 to 7 months show an excess over the average number of deaths. These months always include the four first of the year, December, and generally September. May and November are always a little below the average, and frequently this is the case with August and October. The lowest rate of mortality always appears in June and July.

With regard to the number of deaths in the table, the months will rank in the following order:—January, February, March, April, December, September, May, October, August, November, June, and July. The months of August and September, which formerly were very sickly, by reason, perhaps, of epidemical fevers, are now more healthy. During the seventeenth, and the first half of the eighteenth century, January had the greatest number of deaths; but in subsequent periods, the maximum mortality has occurred in February; the minimum has been invariably in July.

The periods of increase and decrease in the number of deaths will be found to be nearly similar to the like periods in the number of births. As regards the former, there is, in the first place, a period of increase which commences in October or November, and terminates in January or February, the month of the maximum mortality. Then follows a period of decrease, which begins in February or March, and ends in July, the month of the minimum mortality. The increase in the number of deaths re-appears in August, and continues until September, which month, since the eighteenth century, has had the secondary maximum. One remaining month, which, since the seventeenth century, has been October, exhibits a second decrease of deaths, and contains the secondary minimum. The following is the movement of the mortality in accordance with these periods:—

	November.	December.	January.
Period of increase	0·9383	1·0369	1·1551 (maximum.)

	February.	March.	April.	May.	June.	July.
,, decrease	1·1440	1·0944	1·0692	0·9716	0·8545	0·8020 (minimum.)

	August.	September.
,, second increase	0·9498	1·0332 (secondary maximum.)

	October.
,, ,, decrease	0·9510 (secondary minimum.)

The mortality, therefore, is high during the cold months, and in the beginning of spring; it is lower in the summer season, but rises again in August and September.

Some light may be thrown on the question of the influence of the seasons on the mortality of the two sexes by the following table, which shows the number of deaths of each sex, from 1755 to 1833 (1812-13 excepted,) according to the months, and the monthly proportions:—

Months.	Males.		Females.		Above and below the Average.
	Total Number.	Proportions.	Total Number.	Proportions.	
January	2,512	1·1323	2,749	1·1541	– 0·0218
February	2,343	1·1593	2,610	1·1965	0·0372
March	2,444	1·1017	2,830	1·1882	0·0865
April	2,433	1·1332	2,584	1·1210	+ 0·0122
May	2,053	0·9254	2,319	0·9736	– 0·0482
June	1,883	0·8772	1,996	0·8657	+ 0·0115
July	1,792	0·8078	1,848	0·7759	0·0319
August	1,983	0·8939	2,100	0·8817	0·0122
September	2,142	0·9975	2,186	0·9484	0·0491
October	2,178	0·9817	2,221	0·9325	0·0492
November	2,041	0·9506	2,121	0·9199	0·0307
December	2,306	1·0394	2,483	1·0425	– 0·0031
	26,110	12·0000	28,047	12·0000	

We may conclude from these figures that the mortality of the two sexes, according to the seasons, does not differ materially; the greatest difference is not $\frac{1}{12}$; still the regularity in the occurrence of the differences may lead to the following results:—A severe season affects females more powerfully than males. During the four winter months, from December to March, more females die than males, in the proportion of 103·35 to 100. In the months of April, June, July, August, September, and October, the mortality of the males is greatest, being in the proportion of 103·05 to 100 females. But in May, more females than males die, in the proportion of 105·2 to 100; an evidence of the more fatal influence of spring on their animal economy in general.

If a comparison be made of the proportion of births and deaths in the different months, it will be perceived that the number of both births and deaths is above the average in the first four months of the year. The larger number of births at that period of the year may be attributed to the more numerous conceptions in the warm months of spring and summer.

At Geneva, June and July are the months in which conceptions are the most numerous, and the mortality the lowest. The reverse is the case in February, which is the month of the greatest mortality, and, at the same time, of the smallest number of conceptions. Thus the maximum of the mortality corresponds with the minimum of the conceptions, and *vice versâ.*

We have now traced the progress of the population of Geneva, in the several branches of vital statistics, through many years. In early periods, this population, numerically small, was decimated by a heavy mortality, frequently exposed to fatal pestilences, and produced a comparatively large number of infants, of whom but a very small minority lived to the age of puberty. With the advance of civilization, and the rise of prosperity, marriages became less fruitful, the mortality decreased, the duration of life was considerably augmented, and the population not only increased in numbers, but could boast of a much larger proportion of men in the prime of life. At the present day, the fecundity is at its minimum, longevity is considerable, the small number of births and deaths is, perhaps, not equalled in proportion by any town population, marriage is contracted at a more advanced period of life, the population is nearly stationary, and is increased only by immigration and the prolonged duration of life.

In closing this abstract it is but justice to M. Mallet to observe that his memoir can only be properly appreciated by a careful perusal of the original. Many useful suggestions and much valuable assistance will doubtless be derived by subsequent writers from the labours of M. Mallet on the important subject of vital statistics.

Sanitary Statistics of the Metropolis. By R. THOMPSON JOPLING.

[Read before the Statistical Society of London, 14th April, 1851.]

AT the present period, when the sanitary condition of towns is justly engaging so much public attention, a few observations bearing on vital statistics may not be without interest.

Till within a very recent period, this subject has been almost wholly neglected; and whilst every branch of scientific investigation has been steadily on the increase, this alone appears to have been passed over as apparently unworthy of attention. Society, with strange apathy, seems to have forgotten how much the durability of life depends on the physical agents which surround it, and to have paid little or no attention to what, with all, must be a primary consideration—health and longevity.

Until the establishment of a uniform system of registration, statists were denied the means of arriving at anything like a correct estimate of the probabilities of life; and, whilst the means at present in use must necessarily be defective, owing to the difficulty of procuring correct returns, yet we may hope, at no great distance of time, with the present rapid increase of knowledge, to be able to overcome obstacles which now appear insurmountable, and to arrive at more satisfactory and correct data.

To the philosopher, the merchant, and artizan, this subject is of great importance, and embraces in its bearing objects of much interest. Health, and its relation to longevity, must arrest the attention of all who hope to reach the allotted period of life—three-score years and ten. Daily experience demonstrates how much lies within the reach of man to add to his physical powers, and even to prolong existence; and though we cannot hope, through the adoption of sanitary measures, to banish from our cities and towns the usual attendant of civilized societies—disease, yet we may reasonably expect, by means of well-devised hygienic regulations, to deprive it of much of its